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A COLLUVIAL SOIL AND ITS PEOPLE

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It is a matter of common observation that, in most regions of mature topography, the majority of the houses are situated in the valleys rather than on the steep-sloped ridges. Here water is usually easily obtained, the easier grades invite the main roads and, finally, the fertile soils are to be found in the valleys or "bottoms."

But the bottom soils in a rugged region should not be confused with those soils of the same name on a flood plain which are so common in the flat-floored valleys characteristic of middle and late maturity. The latter soils are distinctively alluvial, while the former are colluvial soils and are due to soil creep rather than stream deposition. However, it should not be forgotten that, while soil creep is most pronounced in rugged regions, the process is well-nigh universal, for, wherever there are slopes, steep or gentle, there must be a gentle movement down slope; "a movement," says Professor Davis, "of land waste so slow that it is not generally noticed ...a slow wasting and creeping of the waste down the land slopes, not bodily or hastily but grain by grain, inch by inch..... With countless minute changes every particle is led, slowly but surely, from higher to lower ground."

Where slopes and other conditions are favorable, the movement locally becomes a landslide, an unpleasantly familiar feature in some mountainous regions and also in the sub-polar regions, where Hobbs and Andersson have described the "stone rivers" which, impelled by frequent freezing and thawing, move down valleys. But, in most cases, the phenomena of soil creep is overlooked and it is only in regions of steep slopes that its results become economically important.

The area on which this paper is based is Miller County, Missouri, one of the Ozark counties. The Missouri Ozarks, as a whole, consist of a limestone plateau, once well worn down almost to a plain (peneplain) and later elevated so that the streams have eroded wide valleys which are separated by narrow divides, a region so hilly that the usual term, "Ozark Mountains," is not inapplicable. Near the main streams, erosion has indeed produced a topography that consists entirely of slopes except for some narrow strips of flood plain, a belt known locally as the "river brakes"; while, further back from the zones of active erosion, the old level surface of the old plain extends as ''prairie'' until the next important stream has produced a belt of ''river brakes.''

Like most limestone soils, these Ozark soils are usually heavy, fine-grained silts and clays, but, since the limestone is flinty, the slowly decaying flints are left scattered through the soil. The soils belong to the Clarksville series which overlie much of the Ozarks and also considerable portions of the Allegheny Plateau.

These soils when soaked with water tend to creep down slope somewhat like an overloaded sheet of water, but, of course, very much more slowly. When the soils on a slope are frozen, the solidifying water in the soil spaces expands and slightly moves the grains and, again, when thawing occurs, the grains sink back, not vertically, but diagonally down slope. Again, the surface run-off carries fine particles down the slopes. Thus, as a net result of these factors, the finer silts and clays move more rapidly than the cherts, so that the latter are relatively left behind in the down-slope journey. The principal variant in these soils is that of slope, so that the soil varies mainly with the steepness of the slopes; on the level prairie are the silt loams and clay loams which extend down the gentle slopes; on the steep slopes are the stony loams which grade into the colluvial soils near the slope bases.

Thus the hillsides are stony because of the faster movement of the finer soils and are almost invariably covered with a veneer of stony loam. The finer silts move down slope until, near the base of the slope, they accumulate and here lessen the steepness and so facilitate further deposition. As a result a ''shoulder'' of fine detritus, with its outline often convex to the sky, is formed near the foot of the slope.

This is the colluvial soil strip which is so important in the mountain valleys. The torrential valley stream usually has deposited a narrow belt of stony waste in the colluvial strip, waste that has little agricultural value. The colluvial soil is best described as silty, or technically, it varies from a clay loam to a silt loam. It is generally more sandy than the somewhat stiff upland soil because of the particles of decomposed chert that have moved down slope. The diagram (Fig. 1) shows the general relations of these soils.

Such a colluvial soil is light enough for good tilth and sufficiently porous for good drainage in rainy seasons. It is usually well supplied with moisture both from the seepage water in the valley and from the capillary water which rises from the subsoil to the root zone.

The inhabitants fully realize the importance of these narrow soil belts and generally they are in a high state of cultivation. Farms are large, but a farmer's acreage wealth is estimated more in proportion to the "bottom lands" he owns than to his total acreage. A large acreage of hillside stony loam, which is mostly used for pasture, is balanced by a much smaller acreage of "bottom land" which is expected to furnish the hay, corn, wheat and truck. In laying out the roads that run through the valleys as little colluvial soil as possible has been included. The roads run on the stony loams less than a rod from the smooth colluvial soils and the traveler, jolting along a stony road, looks longingly at the smooth fields but a short distance away. Corn, wheat and alfalfa are the favorite crops and the yields are ordinarily large.

There is the usual response of the people in the "river brakes" to their rather unfavorable environment. Communications are often difficult and crop yields are not large. Their modes of life and of work are largely those of several generations ago. Local idioms, so numerous as almost to constitute a dialect, are still heard but are rapidly becoming obsolete. The daily paper and the schools have brought culture to many homes, as the people are, for the most part, eager for education. The region was largely settled from the Cumberland Plateau of Tennessee and Kentucky, the close resemblance to which in topography, soils and climate was undoubtedly a factor in attracting immigrants to the Ozarks.

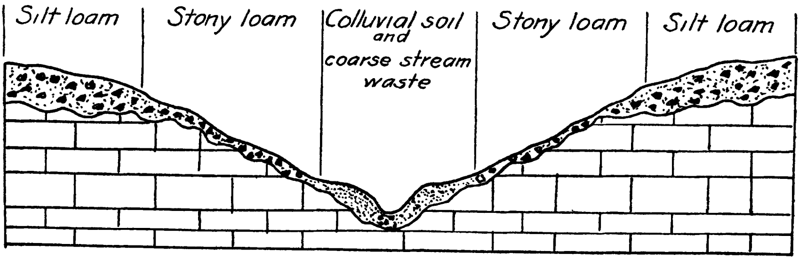

Fig. 1—Diagram showing showing the general relations of the colluvial soils. The vertical scale is much exaggerated.

A prophecy of a widespread future response to soil creep was seen on the farm of a German who probably brought from oversea his thrifty management of hillside soils. He has built across his stony, hillside pasture a rough retaining wall and behind this wall the soil creep is building a narrow terrace of very fertile soil. Such an example is most interesting as indicating a utilization of soil creep when population shall have become denser and agriculture very intensive. Then, it is safe to predict, the stony slopes of many of the limestone hills will show a succession of terraces from base to summit; but such intensive methods are several generations in the future.

While not strictly pertinent to the topic of this paper, it may perhaps be worth while to allude to a politico-economic difference which often crops out between the prairie dwellers and the residents of the ''brakes,'' the ''hill billies,'' as they are often called. The latter very naturally oppose any increase in the county taxes, for their income is, at best, scanty. In the county under observation the opposition of the ''hill billies'' had repeatedly defeated a proposition to build a new court house. The authorities from the prairie districts found that, while they could not construct a new court house without a favorable vote of the people, they were allowed by law to make repairs practically without limit. So the old court house was ''repaired'' by practically building a new structure around the old one.

Summarizing, we have in the area described a maturely dissected limestone plateau where soil creep is necessarily important. The colluvial soil accumulates in a narrow belt near the foot of slopes and is extremely important both because of its fertility and because of the scarcity of arable lands.